MATHEMATICS

1. STANDARD OF THE PAPER

The standard of the paper compared favourably with that of previous years. Candidates' performance this year was slightly better than that of previous years.

2. SUMMARY OF CANDIDATES' STRENGTHS

Candidates exhibited the following as some of their strengths:

(1) finding the multiples of a given number;
(2) finding the factors of a number;
(3) constructing a triangle with a ruler and a pair of compasses only;
(4) calculating the volume of a box;
(5) finding simple interest;
(6) applying Pythagoras theorem.

3. SUMMARY OF CANDIDATES WEAKNESSES

Candidates' weaknesses were shown in the following areas:

(1) making a stem-and-leaf plot of a given data;

(2) finding the total surface area of a box;

(3) solving word problems involving fractions;

(4) inability to recall geometric facts relating to parallel lines and transversals in order to find given angles;

(5) inability to work out probability questions.

4. SUGGESTED REMEDIES TO THE WEAKNESSES

(1) Concept of stem-and-leaf plot should be introduced to students during lessons on statistics;
(2) In finding the total surface area of a box, candidates should be made aware that a box has six faces;
(3) Prospective candidates should be given more exercises on word problems involving fractions.
(4) Prospective candidates should be given more class exercises and assignment, which should be assessed and appropriate feedback given to them for corrections.

5. **DETAILED COMMENTS**

Question 1

(a) **P = {Factors of 30}**
Q = {Multiples of 5 less than 40}
Find P∩Q

(b) **A trader saved GH¢ 200.00 for 3 years at 12% simple interest per annum. What will be the total amount in the trader's account at the end of the 3 years?**

(c) **Evaluate $\frac{4.56 \times 3.6}{0.12}$ and leave your answer in standard form.**

(a) Candidates showed clear understanding of factors and multiples of numbers. Majority of them used these results to find the intersection of the given sets.

(b) Candidates showed mastery in finding simple interest, given the principal, time and rate. They also found the amount correctly by adding the interest to the principal. However, some candidates failed to express their answers in the appropriate units.

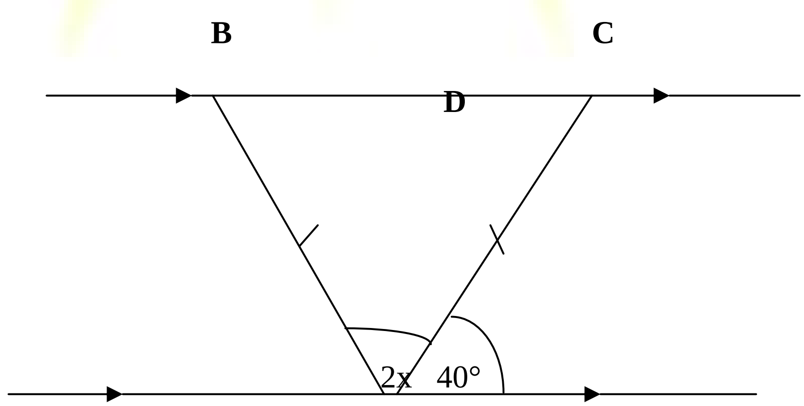
(c) Candidates had difficulty in removing the decimals from the numerator and the denominator in particular. They were not able to multiply them by the appropriate powers of ten for ease of simplifying the given expression.

Question 2

(a) (i) **Ama scored 82, 74 and 90 in three tests. What mark should she score in the fourth test, so that her average mark for the four tests would be 85?**

(ii) **What was her median score in the four tests?**

(b)



E F

NOT DRAWN TO SCALE

In the diagram $\overline{AD}$ is parallel to $\overline{EG}$, angle CFG = 40^{o} and triangle BCF is isosceles. Find the value of:

(i) Angle CBF
(ii) Angle DCF
(iii) *x*.

(a) While some candidates showed clear understanding of average and performed creditably well others performed abysmally. In part (ii) majority of candidates used the descending and ascending order arrangement correctly and applied it to identify the two middle numbers whose average is the median.

(a) There was clear evidence of poor knowledge and understanding of geometry involving parallel lines and triangle. In view of this candidates who attempted this question could not establish that $<$FCB = $<$CFG = 40^{o}, and for that matter could not proceed to solve the subsequent questions.

Question 3

(a) Solve for x, if

$$\frac{1}{3}x + 1\frac{2}{3} < -\frac{3}{4}x - \frac{1}{2}$$

(b) The following shows the distribution of marks of students in an examination.

6	**43**	**26**	**18**	**27**
42	**8**	**22**	**31**	**39**
55	**44**	**37**	**47**	**59**
10	**12**	**36**	**53**	**48**

(i) Make a stem-and-leaf plot of the marks above.
(ii) Find the probability of selecting a student who scored between 40 and 50.

(iii) Find the number of students who passed the examination, if the pass mark was 30.

(a) Most candidates solved the inequality with ease and illustrated the solution on the number line. Some candidates, however, did not reverse the inequality sign on dividing through by a negative factor.

(b) Making a stem-and-leaf plot was generally unpopular with the candidates. Of those who attempted it, most candidates had the stem correct but the corresponding elements under the leaf were either not complete or incorrect.

In part (ii) finding the probability of selecting a student who scored between 40 and 50 posed a challenge to majority of the candidates;

$P(40 < x < 50) = \frac{5}{20} = \frac{1}{4}$

<u>Question 4</u>

(a) A box has length 8.0 cm, width 5.0 cm and height 10.0 cm.
Find the:
(i) total surface area of the box;
(ii) the volume of the box.

(b) (i) Using a scale of 2 cm to 1 unit on both axes, draw two perpendicular axes 0*x* and 0*y* on a graph sheet.

(ii) On the same graph sheet mark the *x* – axis from -5 to 5 and the *y* – axis from – 6 to 6.

(iii) Plot and join the points *A*(0,3), *B*(2,3) and *C*(4,5) to form triangle *ABC*.

(iv) Draw the image $A_1B_1C_1$ of triangle *ABC* under a translation by the vector $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$.

(v) Draw the image $A_2B_2C_2$ of triangle *ABC* under a reflection in the *x* – axis.

(a) In finding the total surface area of the box some of the candidates did not take into account that the box has six faces, and thereby summed up only four surface areas.

(b) The *x* and *y* axes were drawn, labeled and calibrated according to the given scale. There were a few candidates who did not label the axes and others used non-conventional calibration.

The original triangle was correctly drawn by most candidates, but some could not draw the images under the given translation and reflection in the *x*-y plane. However, they plotted their wrong co-ordinates correctly.

<u>Question 5</u>

Using a ruler and a pair of compass only:

(a) (i) construct triangle *PQR* such that $|\overline{PR}|$ = 8 cm, $|\overline{PQ}|$ = 6 and $|\overline{QR}|$ = 5 cm;
(ii) construct the perpendicular bisector of $\overline{PR}$ and label it 1_1;
(iii) construct the perpendicular bisector of $\overline{QR}$ and label it 1_2;
(iv) Label the point of intersection of 1_1 and 1_2 as *N*;
(v) With *N* as centre and radius equal to $|\overline{PN}|$, draw a circle.

(b) (i) Measure the radius of the circle.
(ii) Calculate the circumference of the circle, correct to 3 significant figures.
[Take π= 3,14]

(a) Most of the candidates were able to construct |PR| = 8 cm or |PQ| = 6 cm or

|QR| = 5 cm as the base of the triangle.

In locating the third point, however, relevant arcs were not shown. There was no accuracy in constructing the perpendicular bisectors of PR and QR. Finally, since they could not accurately locate the intersection of the two lines l_1 and l_2, they could not construct the circle to pass through all the vertices of the triangle.

(b) However, candidates who were able to construct the triangle and the circle measured the radius of the circle accurately. It was realized that few candidates used the area of the circle formula in computing the circumference which should not have been the case.

Question 6

(a) **Factorize completely $6xy - 3y + 4x - 2$.**

1. Q

B

P

6 m

NOT DRAWN TO SCALE

The diagram shows a ladder *AB* which leans against a vertical wall *PQ* and *B*.If |*PB*| is 8 m, and the other end of the ladder is 6 m away from the foot of the wall (at *P*), find the length of the ladder (*AB*).

(b) **Kojo had 1800 bags of rice in stock for sale. In January he sold $\frac{2}{3}$ of it. In February, he sold $\frac{3}{4}$ of what was left.**

(i) **What fraction of the stock of rice did he sell?**

(a) **in February?**

(b) **In January and February?**

(ii) **How many bags of rice were left unsold, by the end of February?**

(iii)

(a) Correct grouping of the expression for easy factorization was done by most candidates while others did not make any attempt to answer the question.

(b) Candidates recognized that they were to use Pythagoras theorem to find the length of the ladder. However, others were not able to differentiate the hypotenuse from the adjacent and opposite sides, thereby making wrong substitution into the Pythagoras formula.

(c) Most candidates were not able to translate the word problem into mathematical statement, let alone solve the related problems.

However, few candidates were able to analyse the problem and solved it accordingly.